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ABSTRACT

Reading researchers and theorists are sharply divided as to how meaning is obtained from the printed word. Three current explanations are that (1) meaning is accessed directly, without any intermediate processes; (2) meaning is accessed only through an intermediate phonemic stage; and (3) both direct access and phonemic mediation can occur. To examine these alternative explanations, 24 college students were asked to make judgments about the "meaningfulness" of short phrases. Half of the phrases they saw were meaningful (potato chip), while the remaining half were nonmeaningful. These nonmeaningful phrases were divided into those that were meaningful when pronounced (income tacks) and those that did not sound meaningful (potato ship). The results demonstrated that the students were using a phonemic code in making decisions about the meaningfulness of the phrases. Both longer reaction times and higher error rates on the first exposure to nonmeaningful phrases that sounded meaningful indicated that such a code was being employed and that the code was interfering with meaningfulness decisions. (FL)

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Phonemic code dependence varies with previous exposure to words

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(1) Title of poster: Phonemic code dependence varies with previous exposure to words

(2) Topical session preference: Cognitive, Psycholinguistics, Verbal Processing

(3) Problem or major purpose: Over the years a controversy has been continuing as to the way in which readers access meaning from the printed word. One group of theorists believe in "direct access", that is, that the reader obtains meaning directly from the combinations of letters without any intermediate processes occurring. A second view holds that readers normally recognize a word by its sound representation. This "phonemic stage" view states that accessing meaning without first progressing through the intermediate phonemic stage is difficult if not impossible. Finally, a third hypothesis holds that both models are correct, but that the material being read determines which is employed - difficult material necessitates the phonemic stage, while common, overlearned words (e.g. "the", "and") can be accessed directly. An alternative to this third view holds that both processing modes occur in parallel.

In a very influential study, Baron (1973) demonstrated what appears to be strong support for the "direct access" model. Baron presented subjects with four sets of two-and three-word phrases. Set I phrases sounded meaningful but were not, due to substitution of a word in the phrase with a homophone, e.g., "In the haul." Set 2 phrases were the same as those in Set I, except that the correct homophone was used, e.g., "In the hall." Set 3 phrases neither sounded nor were meaningful, e.g., "Nut and Bout", while Set 4 phrases changed one sound in the Set 3 phrase so as to make it meaningful, e.g., "Nut and Bolt." Thus Sets 1 and 3 should be responded to as not meaningful, and Sets 2 and 4 as meaningful.

In order to test his hypothesis that the direct access model was correct, Baron compared Sets 1 and 3. He reasoned that if a phonemic stage was being used, Set 1 stimuli should be responded to more slowly than Set 3 (because they sound correct), but that if direct access was occurring, the two sets should be rejected equally quickly (because the sound would not be accessed). Results supported the direct access model in that RT's were essentially the same to reject Sets 1 and 3.

In the eight years since its publication this study has been cited more than 75 times as support for the direct access model of reading. However, there are three issues which make this conclusion unconvincing: 1) error rates for the Set 1 stimuli were significantly higher than for the Set 2 stimuli; 2) subjects were shown the set of stimuli prior to the experiment; and 3) each phrase was presented many times to each subject. Thus, it appears possible that subjects were using a phonemic code, but that their over-exposure to the stimuli eventually made direct access possible. Since no data concerning performance over trials was given, the question cannot be answered by Baron (1973). The present study was aimed at determining whether phonemic encoding occurs during early presentations, followed by direct access after repeated presentations.

(4) Subjects: Twenty-four undergraduates served as subjects. They were paid $2.00 each for their participation.

(5) Procedure: Subjects were instructed to respond "yes" or "no" to phrases, depending on whether they were meaningful. Stimuli were displayed in a random order on a cathode ray tube. One half of the 52 stimuli were meaningful (e.g., "Income tax", "potato chip") while the other

half were non-meaningful. Of the 26 non-meaningful stimuli, 13 were phrases that, when pronounced, sounded meaningful (e.g."Income tacks") but were in fact non-meaningful. The other 13 non-meaningful stimuli did not sound meaningful (e.g. "potato ship"). Half of the subjects responded "yes" with their right hand while the other half responded "yes" with their left hand. The 26 meaningful phrases were equated for their meaningfulness by means of meaningfulness ratings completed by 20 psychology students who did not take part in the experiment. Once all 52 phrases had been presented, they were presented again in a new order. Five complete repetitions were performed in this manner, giving a total of 260 observations per subject. Reaction times were recorded by an Appleclock timer.

(6) Results or findings: Of particular interest in this study is the comparison between the non-meaningful phrases which sounded meaningful and those which did not sound meaningful.

Results showed that following a single exposure to each phrase, there was a significant 57 msec RT advantage for the phrases which did not sound meaningful. In addition to being rejected as meaningful more quickly, significantly fewer errors were made on these phrases.

However, following the fifth set of repetitions, there was no RT difference between the two sets of non-meaningful phrases. A small error difference, still favoring the phrases which did not sound meaningful, remained even after five repetitions.

As expected, analysis of both reaction time and errors for the two sets of meaningful phrases showed no significant differences.

(7) Implications and Conclusions: In contrast to previous research, this

this study demonstrated that a phonemic code was being employed in making meaningfulness decisions about short phrases. That is, both the longer reaction times and higher error rates on the first exposure to non-meaningful phrases which sounded meaningful indicated that a phonemic code was being used. In this particular task the phonemic code interfered with the meaningfulness decisions.

After five presentations of each phrase over the experimental session, it appears that the subjects were no longer solely relying on a phonemic code, given that reaction times were identical in the two non-meaningful conditions. However, the continuing higher error rates for the "sounds meaningful but isn't" condition indicates that, at least on some trials, a phonemic code was used, perhaps in parallel with the direct access model.

This study has several implications for the normal reading situation. It appears that upon encountering a word or phrase for the first time, the meaning of that letter string is determined by using an intermediate phonemic code. However, after reading the word repeatedly, the letter string apparently becomes treated as a unit, and can be processed for meaning without referring to a sound representation.

Exactly how recently a word must have been encountered in order for direct access to occur is an empirical question beyond the scope of this research. However, it appears that direct access could occur under two differing sets of circumstances: 1) when the word has very recently been encountered in reading, and 2) when the word is a very common one, not necessarily encountered in the immediate past. Given the redundancy of written material, it seems likely that the first possibility would lend itself to frequent occurrence, and given the

fact that fewer than 500 words account for more than 50% of all words encountered in normal reading, it seems likely that many of the common words in the language are directly accessed as well.

(8) Reference: Baron, J. Phonemic stage not necessary for reading. Quarterly Journal of Experimental Psychology, 1973, 25, 241-245